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ABSTRACT

Protocol materials are defined as records of human behavior in either (1) unaffected or (2) selected or simulated situations. In the first definition, instruction is centered on the results of an analysis of the situation. In the second, theoretical elements provide the basis for selecting or simulating the situation. In either case, the protocol material is the major source of information for thought. The use of protocol materials is based on at least five assumptions centered around the skills which protocol materials are designed to produce in teachers. These skills are observation, diagnosis, analysis, interpretation, and theory construction. Assumption 1 is that when decisions are based on these skills teaching will be more effective. Assumption 2 is that if decisions are not based on these skills, teaching will be less effective. Assumption 3 is that hierarchical sequences of these skills can be developed and presented during instruction which will cause the learner to move from knowledge to theory-based application. Assumption 4 is that protocol materials will give the teacher a better understanding of theory. Assumption 5 is that teaching is an activity which can be subjected to careful analysis. (For each of these assumptions, one or two tasks essential to testing are mentioned.) (MK)

Protocol Materials: A New Answer to an Old Problem?

Whenever an innovative tool for teacher training rises as a recognizable entity, there always surfaces with it eager supporters who, in their zeal, do little to help refine the technique and to develop a highly finished product. Often, there is considerable risk that the tool will either be torn into so many fragments that it can never be reorganized or be irretrievably sunk into a quagmire of other ideas and innovations. Such is the case with protocol materials, a very promising tool for training teachers. If the concept of protocol materials is to survive as a viable means for training, it must be given clear meaning, the intended uses of protocol materials must be specified, and the assumptions which underlie the uses must be clearly isolated and put to rigorous test. The intent of this article is (1) to establish two pragmatic definitions for the term, *protocol materials*, (2) to describe the uses to which the materials may be put, (3) to isolate several assumptions which underlie the uses of protocol materials, and (4) to specify some of the tasks which must be accomplished in testing the assumptions. If the new tool is to be of maximum use in training, careful attention must be given to the tasks involved in testing the underlying foundation of the concept of protocol materials.

What Are Protocol Materials

Three distinctly different meanings of the term, *protocol materials*, have found broad enough use to warrant the attention of those interested

in the activities now centered on the materials. By the first of these, protocol materials are *unedited records of human behavior in an unaffected situation*--normally a place where instruction and learning are taking place. Using this definition, a video recording of a learner responding to a teacher's question would be a protocol material, provided that the record was made in an unsimulated setting and remained unedited for use. Such adjectives as *raw, untouched, and virgin materials* may be helpful in clarifying this meaning. Either is more apt than the word, *protocol*, which has no definition that will convey the intended meaning.

By the second meaning, *records of human behavior that have either been selected or developed to illustrate specific concepts or theoretical constructs about human behavior* are referred to as protocol materials. There is an important difference between this and the first definition. If a video recording of a learner responding to a teacher's question were used to illustrate a concept, say that of cueing, this record would be a protocol material by either the first or the second definition. On the other hand, if the record had been obtained by putting both the learner and the teacher in a situation where they acted out a script whose purpose was to illustrate the concept of cueing, the record would be a protocol material by the second definition only. Since it may be argued that one could only tell the difference if he knew the origin of the record, this may seem to be a trivial distinction. Such is not the case. By the first definition, it is as if one were observing a lunar rock, but by the second, a painted chunk of Styrofoam resembling the rock. Such adjectives as *simulated* and *modeled* may help bring out the distinction between the two meanings.

The third meaning is for those who prefer definitions that allow enough weasel room to make even the most uninformed comfortable with the concept. Protocol materials are *any materials that can be used to help the teacher diagnose, analyze, and interpret school events.* Since any example is appropriate to illustrate this definition, none will be offered. Furthermore, since such a vague definition is quite useless for this discussion, no further mention of it will be made.

While the last definition is exceptionally bad, it has one redeeming feature. It focuses attention on the use to which protocol materials are to be put, and the thing about protocol materials which makes them interesting to the teacher trainer is their intended use in the training program. This is also what makes using them successfully so difficult.

Before considering the uses of protocol materials, it may be worth noting that the concept is quite old. Most educators will not be misled by the new name but will recognize that protocol materials are among the oldest available teaching tools.

> *And he taught them many things by parables, and said...*
> Saint Mark 4:2

How Are Protocol Materials Used?

According to the definitions in current use, protocol materials are either unedited records of human behavior in unaffected learning situations, or they are records especially selected or developed to illustrate specific concepts or theoretical constructs about behavior in learning situations. Whether these materials depict a genuine learning situation, actual or contrived, is an important criterion for considering them protocol materials.

In any case, protocol materials are to be used to teach the skills of diagnosis, analysis, interpretation, theory construction and testing, and, to a lesser extent, to convey information to teachers. The procedure used to accomplish this task depends upon which meaning of protocol materials pertains.

In the case of unedited records of unaffected situations, those situations teachers face while working in actual learning environments, and which require analysis, interpretation, decision, and action are identified and recorded. The chief criterion for selecting a situation to record is the frequency with which it is likely to occur. Those situations most often encountered by a teacher are the ones best suited for recording. Once made, these recordings are carefully studied by the trainer to determine what information should precede the teacher's exposure to the record and what objectives are to be achieved by the teacher. Next the recorded situations and the prerequisite learnings are arranged in some form of hierarchy. The teacher is then exposed to the recorded situations in an instructional setting. During this exposure, she is taught or is allowed to discover the prerequisite information while she diagnoses, analyzes, interprets, and constructs theory using the record as a primary source of information for thought.

For simulated or selected records, the procedure is quite different. Theoretical concepts or consturcts which are potentially useful in actual learning environments are selected and organized by the trainer. Records of situations which illustrate these concepts and constructs are either identified or simulated and recorded. The teacher is then exposed to the records in an instructional setting designed to bring the theory and the reality into close enough proximity so that, with minimal instruction,

she can make the connections desired. As in the case of the unedited materials, she diagnoses, analyzes, interprets, and constructs theory but may also test a theory by determining whether the hypotheses that can be generated from it hold up in the recorded situation. Regardless of which definition of protocol materials one is considering, the record is the focal point for learning. It is the teacher's primary source of thought.

What Assumptions Underly the Uses of Protocol Materials and What Tasks Do the Assumptions Suggest?

Several very important assumptions underly the uses of protocol materials in teacher-training programs. Evidence to substantiate the validity of these assumptions, however, is very sketchy. It is essential that teacher-educators identify these assumptions, attach some order of importance to them, and then set about the arduous task of demonstrating their validity. What follows is not an exhaustive list but a brief statement of some assumptions which underly the uses of protocol materials. For each of the assumptions, one or two tasks essential to testing are mentioned.

Assumption 1. If a teacher is taught to diagnose, analyze, interpret, and construct theory using theoretical knowledge as a base and recorded learning situations as the primary source of information for thought, she will make decisions based on these processes when she is teaching, thereby rendering teaching more effective.

While there is some research to indicate that teachers with a broader knowledge of theory have a broader concept of teaching and exhibit a wider range of behaviors in teaching, the effect this has on student

achievement is unknown. The first task, then, is to demonstrate a clear relationship between the knowledge of pedagogical theory and its use in practice. Since educators often admit that they *know more than they practice*, this task may not be easy to accomplish.

A second task, dependent on accomplishing the first, is to identify the criteria for determining effective teaching and then demonstrate a relationship between the use of pedagogical theory and these criteria. The effect of theory use on learner achievement may be one such relationship. It goes without saying that this will not be an easy task.

Assumption 2. If a teacher is not taught to diagnose, analyze, interpret, and construct theory using theoretical knowledge as a base and recorded learning situations as primary source of information for thought, she will make biased decisions based mainly on experience, thus rendering teaching less effective.

While by no means a trivial assumption, this one is easily handled along with *Assumption 1*, since it is the converse of 1. No more will be said concerning it at this point.

Assumption 3. Given records of human behavior, the knowledge and theoretical concepts and constructs underlying that behavior can readily be isolated, prerequisite knowledges can be identified, hierarchical sequences within and among records can be developed, and these can be presented during instruction in a way which will cause the learner to move from knowledge to theory-based applications.

A considerable body of research has been accumulated which enables one to analyze records of human behavior and isolate theoretical concepts and constructs that are useful in teaching. It is fairly easy for one who can do this to specify what knowledge is required to grasp the essence

of these concepts and constructs. Unfortunately, however, very few of those professors who are engaged in the training of teachers have the required skills to do such analyses. Those few who possess necessary skills can seldom spare the large amounts of time required for careful and exhaustive analysis and validation of the results of such analysis. When they do have the time, it is usually spent in special research projects rather than in preparing instructional materials. These projects may have little relationship to teaching. Lest professors of education be accused (*Heaven forbid!*) of requiring their students to do something they are themselves unprepared to do, something must be done to prevent it.

A third task, therefore, is to involve teacher trainers in programs of in-service training designed to equip them with the skills to observe records of human behavior in specific learning situations; to systematically analyze these situations in order to identify their theory-related elements; and to plan instruction designed to lead the student through a similar analysis and bring him to a point where he can interpret his analysis, construct theory-based assumptions, and test these assumptions using a recorded or an actual learning situation.

Identifying prerequisite knowledge and developing hierarchial sequences are much more difficult tasks. Techniques of constructing and validating learning hierarchies for large instructional sequences are in a somewhat primitive stage of development. Available techniques work well with subject matter which has some inherent structure, such as mathematics. They do not work well with the less structured subject matter of courses and activities in teacher training.

Isolating theory-related elements from records of human behavior and constructing hierarchies which begin with certain prerequisite knowledge

and intellectual skills and culminate with certain specified, higher-order intellectual skills by no means gets one off the hook--assuming that this can be done. Higher-order intellectual skills generally involve a higher-order of learning. The conditions which must be established to promote this learning get somewhat complex, and they are difficult to ensure in a typical learning environment for teachers. Furthermore, the teacher brings to any learning situation a unique profile of intelligence. If she is weak in certain cognitive operations, she may never perceive a set of structurally related elements--no matter how carefully they have been tied together during instruction. It may very well be that the majority of students in teacher-training programs are incapable of operating at the cognitive level required in the use of protocol materials.

A fourth task involves constructing and validating the sequences (hierarchies) of instruction designed to teach the learner to observe, diagnose, analyze, interpret, and construct theory. It cannot be left up to a trainer to decide whether a particular sequence of instruction accomplishes these objectives without requiring of him some evidence to support the contention that it does.

The fifth task, related to the fourth, is to determine whether all teachers are able to achieve these higher levels of cognitive activity and to construct intellectual profiles for those who can. Such profiles would be very useful in diagnosis and instruction.

Assumption 4. Theory-based diagnosis, analysis, interpretation, and theory construction using protocol materials will give the teacher a better understanding of theory than she is getting with existing tools

and will result in the use of theory in practice, hence, a narrowing of the gap between theory and practice.

If the first task (establishing a clear relationship between a knowledge of theory and its use in practice) is accomplished, it will still be necessary to determine whether a better understanding of theory is made possible through the use of protocol materials than is being achieved with existing tools. This sixth task could be accomplished with relative ease, provided that agreement can be reached on what constitutes understanding of theory, and provided instruments can be devised to measure this understanding. Although it will be difficult, this task is within reach, given the high level of development of evaluation and measurement techniques.

Once something is known about the teacher's understanding and use of theory and about the relationship of these to learning, one can begin to address the problem of narrowing the gap between theory and practice. Until then, however, it makes little sense even to raise the question.

Assumption 5. Teaching is an activity which can be subjected to careful analysis.

This assumption raises the age-old question of whether teaching is an art, a science, or some combination of the two. In order to accomplish the aforementioned tasks, however, one must take the position that teaching is at least partly a science. To do otherwise would render the tasks required to verify the assumptions completely useless.

Some educators will find this an objectionable position. To take the position that teaching is an art, however, closes the question; to take the position that it is at least partly a science makes it possible to explore the question. This appears to be the better alternative.

Summary

Protocol materials may be defined as records of human behavior in (1) unaffected situations or (2) selected or simulated situations. Normally the situation is one in which instruction and learning are taking place. These materials are used to produce teachers who possess the complex skills of observation, diagnosis, analysis, interpretation, and theory construction. The methods of instruction depend on which definition of the term, *protocol material*, is being used. In the first, the situation provides the theoretical elements and instruction is centered on the results of a careful analysis of the situation. In the second, the theoretical elements provide the basis for selecting or simulating the situation. Instruction is planned around the theory, and the recorded situations are used to bring out the theory. In either case, the protocol material is the major source of information for thought.

Underlying the use of protocol materials are at least the following five assumptions:

Assumption 1. If a teacher is taught to diagnose, analyze, interpret, and construct theory using theoretical knowledge as a base and recorded learning situations as the primary source of information for thought, she will make decisions based on these processes when she is teaching, thereby rendering teaching more effective.

Assumption 2. If a teacher is not taught to diagnose, analyze, interpret, and construct theory using theoretical knowledge as a base and recorded learning situations as primary source of information for thought, she will make biased decisions based mainly on experience, thus rendering teaching less effective.

Assumption 3. Given records of human behavior, the knowledge and theoretical concepts and constructs underlying that behavior can readily be isolated, prerequisite knowledges can be identified, hierarchical sequences within and among records can be developed, and these can be presented during instruction in a way which will cause the learner to move from knowledge to theory-based applications.

Assumption 4. Theory-based diagnosis, analysis, interpretation, and theory construction using protocol materials will give the teacher a better understanding of theory than she is getting with existing tools and will result in the use of theory in practice, hence, a narrowing of the gap between theory and practice.

Assumption 5. Teaching is an activity which can be subjected to careful analysis.

These assumptions are either untested, or the information needed to substantiate them is scant. If they are not to remain untested, several tasks must be accomplished. Unless teacher trainers attend to these tasks, many questions which are likely to be asked about the value of learning activities using protocol materials can only be answered with weak, opinionated answers. In this age of educational accountability this is not what we should be about.

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